COLD INJURIES: DESCRIPTION, TREATMENT AND PREVENTION

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Introduction

Prevention of cold injuries is a Command and Individual Responsibility

ALL COLD WEATHER INJURIES ARE PREVENTABLE!!!

Outline

- Susceptibility Factors
- Cold Weather Injuries
  - description
  - treatment
  - prevention
- Conclusion

Regulation of Body's Temp

- Body's heat production
  - **metabolism**
  - **exercise**
  - **shivering**
- Heat loss
  - **convection**
  - **conduction**
  - **radiation**
  - **respiration**
  - **evaporation**

Typical Victim of a Cold Weather Injury

- Male
- E-4 or below
- Approximately 20 years old
- From a warm climate
- Less than 18 months time in service
- Uses tobacco, alcohol or medications
- Neglects proper foot care

Susceptibility Factors

- **Previous cold weather injury**
- **Inadequate nutrition**
- **Alcohol, caffeine, nicotine**
- **Dehydration**
- **Overactivity**
- **Underactivity**
- **Long exposure to the cold**
- **Sick or injured**
- **Acclimatization**
- **Ethnic/geographic origin**
- **Wind, cold, rain**
- **Age**
- **Discipline and morale**
- **Physical stamina**
- **Inadequate training**
- **Poor clothing and equip**

Types of Cold Injuries

- Hypothermia
- Frostbite
- Chilblains
- Immersion/Trench Foot
- Dehydration
- Constipation
- Sunburn
- Snow Blindness
- Carbon Monoxide Poisoning

Hypothermia

- MEDICAL EMERGENCY; life threatening condition
- Severe body heat loss-body temp falls below 95◦F
- Occurs when:
  - **conditions are windy, clothing is wet, and/or the individual is inactive**
  - **extended water exposure or immersion**
    - **1 hour or less when water temp is below 45◦F**
    - **prolonged exposure in slightly cool water (e.g. 60◦F)**
    - **thunderstorms, hail, rain and accompanying winds**

Hypotherm

The “umbles”-stumbles, mumbles, fumbles, and grumbles

- Initial Symptoms
  - **shivering**
  - **dizzy, drowsy**
  - **withdrawn behavior**
  - **irritability**
  - **confusion**
  - **slowed, slurred speech**
  - **altered vision**
  - **stumbling**
- Severe Stages
  - **stops shivering**
  - **desire to lie down and sleep**
  - **heartbeat and breathing is faint or undetectable**
  - **unconsciousness followed by DEATH**

Hypothermia

- Treatment
  - **prevent further cold exposure**
  - **evacuate immediately if severe hypothermia**
  - **remove wet clothing**
  - **rewarm with body-to-body contact or in a warmed sleeping bag**
  - **warm, sweet liquids if conscious**
  - **give CPR if needed**

Hypothermia

- Prevention
  - **eat properly and often**
  - **warm liquids (noncaffeinated) and water**
  - **wear uniform properly (layers worn loosely)**
  - **keep active**
  - **stay dry**
  - **warming tents**
  - **get plenty of rest**
  - **buddy watch/observation/NCO checks**

BODY TEMP	SYMPTOMS	OBSERVABLE IN OTHERS	FELT BY YOURSELF
(Early Stage) 98.6 ⇒ 95.0	Intense and uncontrollable shivering; ability to perform complex tasks impaired	Slowing of pace. Intense shivering. Poor coordination.	Fatigue. Uncontrollable fits of shivering. Immobile, fumbling hands.
(Moderate Stage) 95.0 ⇒ 91.4	Violent shivering persists, difficulty in speaking, sluggish thinking, amnesia begins to appear.	Stumbling, lunching gait. Thickness of speech. Poor judgment.	Stumbling. Poor articulation. Feeling of deep cold or numbness.
(Severe Stages) 91.4 ⇒ 87.8	Shivering decreases; replaced by muscular rigidity and erratic, jerky movements; thinking not clear but maintains posture.	Irrationality, incoherence. Memory lapses, amnesia. Hallucinations. Loss of contact with environment.	Disorientation. Decrease in shivering. Stiffening of muscles. Exhaustion, inability to get up after a rest.
87.8 ⇒ 85.2	Victim becomes irrational, loses contact with environment, drifts into stupor; muscular rigidity continues; pulse and respiration slowed.	Blueness of skin. Decreased heart and respiratory rate. Dilation of pupils. Weak or irregular pulse. Stupor.	Blueness of skin. Slow, irregular, or weak pulse. Drowsiness.
85.2 ⇒ 78.8	Unconsciousness; does not respond to spoken work; most reflexes cease to function; heartbeat becomes erratic.	Unconsciousness.	
78.8 ⇓	Failure of cardiac and respiratory control centers in brain; cardiac fibrillation; probable edema and hemorrhage in lungs; apparent death.		

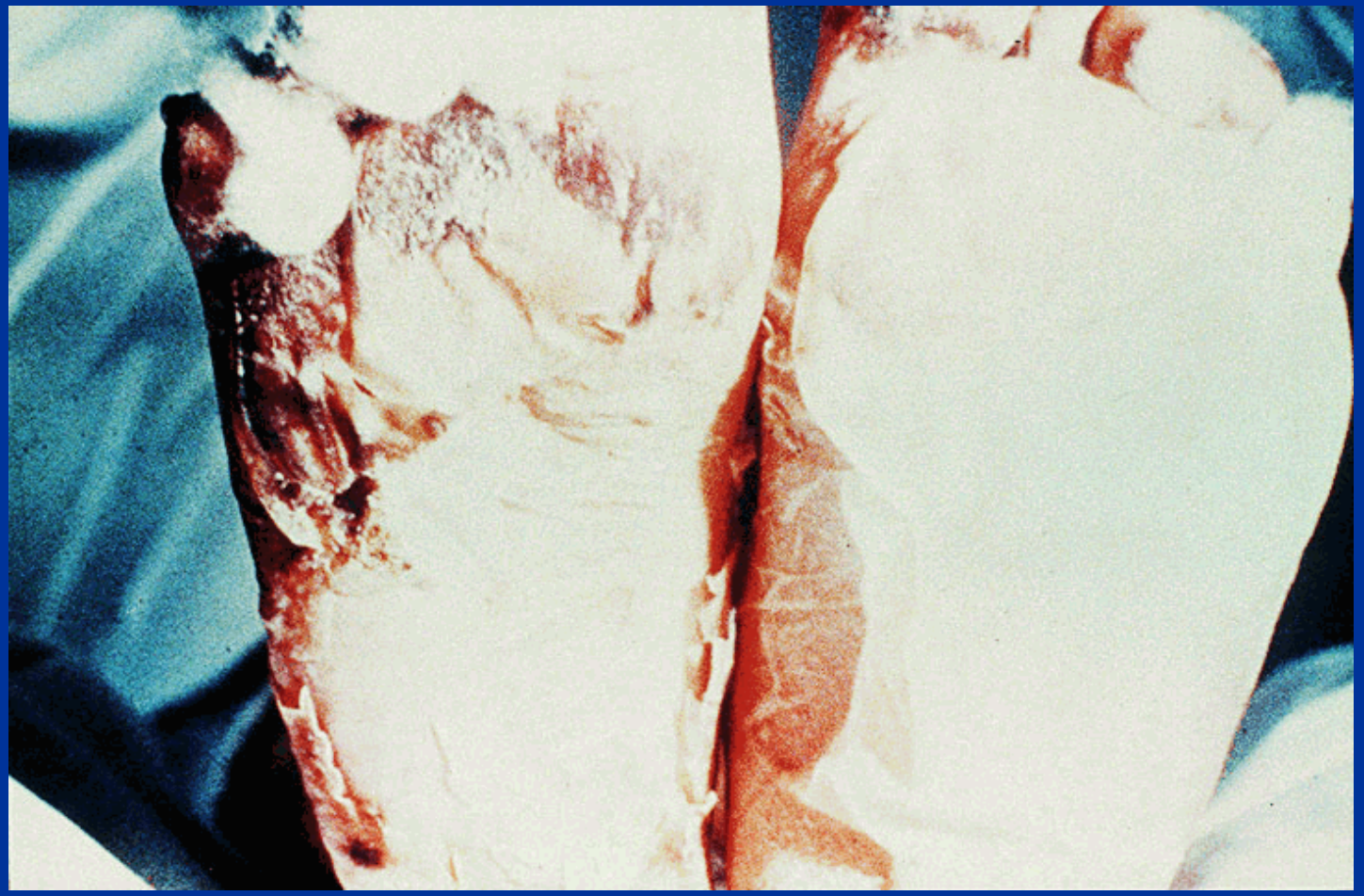
Frostbite

- Air temps below 32°F
  - **skin freezes at 28°F**
- Superficial frostbite (mild)
  - **freezing of skin surface**
- Deep frostbite (severe)
  - **freezing of skin and flesh, may include bone**
- Hands, fingers, feet, toes, ears, chin, nose, groin area

Frostbite

- Symptoms
  - initially redness in light skin or grayish in dark skin
  - tingling, stinging sensation
  - turns numb, yellowish, waxy or gray color
  - feels cold, stiff, woody
  - blisters may develop

Deep Frostbite



Frostbite

- Treatment
  - **remove from cold and prevent further heat loss**
  - **remove constricting clothing and jewelry**
  - **rewarm affected area evenly with body heat until pain returns**
    - **when skin thaws it hurts!!**
    - **do not rewarm a frostbite injury if it could refreeze during evacuation or if victim must walk for medical treatment**
  - **do not massage affected parts or rub with snow**
  - **evacuate for medical treatment**

Frostbite

Frostbite

- Prevention
  - **wear uniform properly (layers and loosely)**
  - **keep socks and clothing dry (use poly pro/thermax liner socks and foot powder/ change insoles also)**
  - **protect yourself from wind**
  - **drink hot fluids and eat often**
  - **keep active**
  - **insulate yourself from the ground (sleeping pad/tree branches etc…)**
  - **“Buddy System”**
  - **warm with body heat**
  - **caution skin contact with super-cooled metals or fuel**
  - **seek medical aid for all suspected cases**

Chilblains

- Nonfreezing cold injury
- Cold, wet conditions (between 32-60^{o}F, high humidity)
- Repeated, prolonged exposure of bare skin
- Can develop in only a few hours
- Ears, nose, cheeks, fingers, and toes

Chilblains

- Symptoms:
  - initially pale and colorless
  - worsens to achy, prickly sensation then numbness
  - red, swollen, hot, itchy, tender skin upon rewarming
  - blistering in severe cases

Chilblains

- Treatment
  - prevent further exposure
  - wash, dry gently
  - rewarm (apply body heat)
  - don’t massage or rub
  - dry sterile dressing
  - seek medical aid

Chilblains

- Prevention
  - keep dry and warm
  - cover exposed skin
  - wear uniform properly
  - use the “Buddy System”

Trench/Immersion Foot

- Potentially crippling, nonfreezing injury (temps from 50°F-32°F)
- Prolonged exposure of skin to moisture (12 or more hours, days)
- High risk during wet weather, in wet areas, or sweat accumulated in boots or gloves

Trench/Immersion Foot

- Symptoms
  - **initially appears wet, soggy, white, shriveled**
  - **sensations of pins and needles, tingling, numbness, and then pain**
  - **skin discoloration-red, bluish, or black**
  - **becomes cold, swollen, and waxy appearance**
  - **may develop blisters, open weeping or bleeding**
  - **in extreme cases, flesh dies**

Trench/Immersion Foot

Trench/Immersion Foot

- **Treatment**
  - **prevent further exposure**
  - **dry carefully**
  - **DO NOT break blisters, apply lotions, massage, expose to heat, or allow to walk on injury**
  - **rewarm with body heat**
  - **clean and wrap loosely**
  - **elevate feet to reduce swelling**
  - **evacuate for medical treatment**

Trench/Immersion Foot

- Prevention
  - keep feet dry
  - change socks at least every 8 hours or whenever wet and apply foot powder
  - bring extra boots to field
  - no blousing bands
  - report all suspected cases to leadership

Dehydration

- A loss of body fluids to the point of slowing or preventing normal body functions
- Increases chance of becoming a cold weather casualty, esp hypothermia
- Can lead to heat cramps or heat exhaustion

Dehydration

- Symptoms
  - dark urine
  - headache
  - dizziness, nausea
  - weakness
  - dry mouth, tongue, throat, lips
  - lack of appetite
  - stomach cramps or vomiting
  - irritability
  - decreased amount of urine being produced
  - mental sluggishness
  - increased or rapid heartbeat
  - lethargic
  - unconsciousness

Dehydration

- Treatment
  - drink WATER or other warm liquids
  - avoid caffeinated liquids (sodas, coffee, tea)
  - do not eat snow
  - rest

Dehydration

- Prevention
  - drink minimum of 3 canteens of water daily for inactivity and 5-6 quarts for activity
  - monitor urine color
  - do not wait until you are thirsty
  - drink hot liquids for warmth (non-caffeine)

Sunburn

- Burning of the skin due to overexposure to the sun and UV light
- Contributing factors
  - fair skin, light hair
  - exposed skin
  - reflective qualities of the snow
  - high altitudes
- Symptoms
  - redness of skin, slight swelling (1st deg)
  - prolonged exposure (2nd deg)
    - pain and blistering
    - chills, fever, headache

Sunburn

- Treatment
  - **soothing skin creams in mild cases**
  - **in severe cases, seek medical attention**
  - **aspirin for pain**
- Prevention
  - **cover exposed skin with clothing**
  - **sunscreen, lip balm**
  - **limit exposure of skin to the environment**

Carbon Monoxide Poisoning

- When oxygen in the body is replaced by carbon monoxide
  - colorless, odorless, tasteless gas resulting from incomplete combustion
- Inadequate ventilation from engines, stoves, heaters

Carbon Monoxide Poisoning

- Symptoms
  - headache
  - dizziness
  - weakness
  - excessive yawning
  - ringing in ears
  - confusion
  - nausea
  - bright red lips, eyelids
  - drowsiness
  - unconsciousness
  - possibly death

Carbon Monoxide Poisoning

- Treatment
  - move to fresh air immediately
  - seek medical aid promptly
  - provide mouth-to-mouth resuscitation if victim is not breathing

Carbon Monoxide Poisoning

- Prevention
  - **ensure proper ventilation**
  - **don’t use unvented heaters or engines**
  - **ensure heaters are regularly serviced**
  - **turn heaters off when not needed (during sleep)**
  - **never sleep in vehicle with engine running**
  - **never wrap poncho around vehicle exhaust to collect heat**

Snow Blindness

- Inflammation and sensitivity of the eyes caused by ultraviolet rays of the sun reflected by the snow or ice
- Symptoms
  - gritty feeling in eyes
  - redness and tearing
  - eye movement will cause pain
  - headache

Snow Blindness

- Treatment
  - **remove from sunlight**
  - **blindfold both eyes or cover with cool, wet bandages**
  - **seek medical attention**
  - **recovery may take 2-3 days**
- Prevention
  - **eye protection**
    - **dark, UV protective glasses**
    - **field expedient-cut narrow slits in MRE cardboard and tie around head**
  - **do not wait for discomfort to begin**

Conclusion

- Dress properly
- Drink plenty of fluids
- Eat right
- Keep in shape
- Get plenty of rest
- Minimize periods of inactivity
- Maintain a positive attitude

Reference Materials

- Center for Army Lessons Learned Newsletter No. 97-5 *Winning in the Winter*
- Technical Note No. 92-2 *Sustaining Health and Performance in the Cold: Environmental Medicine Guidance for Cold-Weather Operations*
- TC 21-3 *Soldier's Handbook for Individual Operations and Survival in Cold-Weather Areas*
- FM 31-70 *Basic Cold Weather Manual*
- FM 21-10 *Field Hygiene and Sanitation*
- FM 21-11 *First Aid for Soldiers*
- TB MED 81 *Cold Injury*
- FD Pam 40-5 *Win in the Heat and Cold: Climatic Injury Prevention Guide*

Reference Materials

- Calculating Wind Chill Equivalent Temperature (WCET)
  - **Find wind speed on left side of chart**
  - **Find actual temperature on top row**
  - **Wind chill equivalent temperature located where the two intersect**
- Website: www.nws.noaa.gov/om/wind chill

QUESTIONS?

Test

1. One of the following mechanisms does not contribute to heat loss:
   A. Convection
   B. Conduction
   C. Regulation
   D. Evaporation

2. True or False? A typical victim of a cold weather injury is senior non-commissioned officer.

3. True or False? Hypothermia is a life threatening condition.

Test

4. Which of the following are considered symptoms of hypothermia?
   A. Shivering
   B. Hyperactivity
   C. Extreme hunger
   D. Irritability

   A&B
   A&D
   B&C
   All of the above

5. True or False? Skin freezes at 28 F.

6. Which of the following frostbite treatment methods is considered inappropriate?
   A. Remove constricting clothing and jewelry
   B. Rewarm affected area evenly with body heat until pain returns
   C. Evacuate for medical treatment
   D. Massage affected area vigorously

Test

7. Frostbite prevention includes:
    A. Avoiding skin contact with cooled metals or fuel
    B. Protection from the wind
    C. Keeping clothing dry
    D. Insulating yourself from the ground

    A & C
    A only
    None of the above
    All of the above

8. True or False? Chilblains is considered a freezing cold injury.

Test

9. True or False? Chilblains can develop in a few hours.

10. True or False? Trench/Immersion Foot is caused by exposure to very cold temperatures.

11. Which of the following is a symptom of Trench/Immersion Foot?
    A. Green skin discoloration
    B. Hardening of the skin
    C. Blistering of the skin
    D. Nausea

12. True or False? Dehydration increases your chances of becoming a cold weather injury.

Test

13. The contributing factor/factors that might put you at risk for sunburn is/are:

A. Dark skin
B. Exposed skin
C. Lower altitude
D. Dark clothing

A, B, C,
C & D
C only
B only

Test

14. Which of the following is not a symptom of carbon monoxide poisoning?
    A. Red lips, eyelids
    B. Ringing in ears
    C. Excessive yawning
    D. Coughing

15. True or False? Snow blindness only occurs from the reflection of the sun off of snow.